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AUTHOR Tuckman, Bruce W.
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ABSTRACT

In an attempt to identify effective instructional approaches, teachers were videotaped while teaching remedial mathematics. Teacher behaviors were coded and student achievement scores analyzed. Eight categories were found which distinguished between effective and ineffective teachers, including: instruction for the whole class simultaneously rather than individualized or small group work; review of seatwork with immediate feedback; use of questions rather than statements; use of questions that require students to perform rather than explain; neutral responses rather than praising or critical ones to student answers; monitoring to provide continuous feedback; and use of the majority of class time for instruction. Teachers from another group who were taught to incorporate these guidelines were found to have students with greater mathematics achievement. (CL)

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How To Successfully Teach Slow Learners: 8 Empirically-Validated Effective Nostrums of Teaching (EVENTs)

Bruce W. Tuckman

What is the best way to discover if there are any especially effective ways of teaching a particular subject matter to a specific population? Certainly one sensible way would be to identify teachers who are highly effective in teaching that subject-matter to this population and other teachers who are substantially less effective and seeing what things the two groups of teachers do differently. To use this approach, one must first have a yardstick or criterion that can be applied to the teaching and learning of the subject-matter in question to determine degree of effectiveness. The criterion of teaching effectiveness that we used was student achievement. The more effective a teacher is, we contended, the more the students who are taught by that teacher will achieve.

So far, we are saying that (1) effective teachers produce achieving students, and (2) they do so by using certain teaching techniques that, when employed, can be expected to continue to yield enhanced student achievement. Unfortunately, student achievement in every subject-matter cannot be measured with a

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high degree of objectivity and reliability. In many qualitative subjects, like literature, there is limited agreement on exactly what is to be achieved and how much achievement has occurred. Measuring achievement becomes a highly subjective process. However, in most quantitative subjects, like mathematics, intended outcomes can be stated and their attainment measured with reasonably great objectivity and precision. Therefore, to apply this approach it may be necessary to restrict oneself to the quantitative subjects. We, for example, limited our study to the subject of mathematics. Moreover, we chose remedial mathematics at the college entry level because of the inordinately high student failure rate, suggesting the existence of room for considerable improvement in teaching.

The next step was quite straightforward. We examined student achievement records over a period of years for faculty members teaching the remedial mathematics course, a process made possible by the use of a common achievement test used as an exit criterion across all class sections which, moreover, was scored in a uniform manner with each faculty member scoring the same items across all students taking the test regardless of section. Some teachers' classes consistently had high mean scores on the exam and some consistently had low mean scores. Given the essentially random assignment of students to classes, we could only conclude that some teachers were effective and others not.

Next, we sought to enlist the cooperation of

representatives from both groups, such cooperation taking the form of a willingness to be videotaped on a few occasions while teaching. Then we viewed and re-viewed the videotapes, not knowing which teachers were is which group, and coded their teaching behavior. Our coding system embodied the state of the art for coding the style and content of mathematics instruction and included categories that those before us studying elementary school mathematics instruction found to be associate with effectiveness as we were defining it.

Our procedures generated eight categories which distinguished between the two groups. That is, the effective teachers used these eight techniques or approaches much more often than the ineffective teachers did leading us to hypothesize that if you used these eight techniques in teaching remedial mathematics, your students would achieve more than if you did not use them. We coined the acronym EVENT to stand for Empirically-Validated Effective Nostrum of Teaching. (A "nostrum" is an old-fashioned word for "rule.") We hypothesized that when the EVENTs took place, the students achieved.

Before I tell you what these EVENTs are, let me first tell you that we picked a small group of remedial mathematics teachers other than the ones we had oiginally videotaped and studied and we taught this second group the EVENTs and how to incorporate them into their teaching. Thereafter, we videotaped them and viewed the videotapes with them, individually, and gave

them feedback on whether or not they were effectively using the eight EVENTs in their teaching. Over the course of the semester that we did this, they became more and more adept at using the EVENTs as part of their teaching style and their use became more and more frequent. At the end of the term we compared the achievement of their students to that of their colleagues' stuents and, lo and behold, their students achieved significantly more. Thus, being sufficiently convinced that we had found some teaching guidelines that would improve the achievement of remedial mathematics students, we became bold enough to offer them to anyone who would listen. Here, then, are the eight EVENTs.

EVENT No.1. TEACH THE WHOLE CLASS AT THE SAME TIME. In spite of past admonitions to teachers to try to individualize instruction, presumably by having students do individually-prescribed seatwork or work in small groups, our results show that learners with a history of poor performance are much more likely to pay attention if they are in "contact" with the instructor. The only way every student can potentially be in contact with the instructor is if they are all being taught the same thing at the same time. They will all be challenged if they represent a reasonably homogeneous group of learners which is usually the case in remedial classes. Therefore, you should prepare a lesson that is intended for

everyone in the class and deliver that lesson to everyone in the class simultaneously.

EVENT No. 2. SPEND YOUR TIME GOING OVER SEATWORK EXERCISES RATHER THAN EITHER GOING OVER HOMEWORK EXERCISES OR LECTURING. The two points to be incorporated here are first, participative learning and second, immediate feedback. The best way to proceed is to give your class a short, common seatwork assignment at the start of the period and then spend time going over the problems included in that assignment. Going over seatwork immediately after its completion provides a better vehicle for immediate feedback than going over homework from one or two days before. It also increases the likelihood of holding student attention, in contrast to lecturing, because it relates to work they themselves have done and thus builds in a participatory role for them.

EVENT NO. 3. TEACH BY ASKING QUESTIONS RATHER THAN BY MAKING STATEMENTS. We call this the interrogative format and it seems to work because it gives students a greater chance to participate actively in the lesson. Lecturing, or using the declarative format, forces students into a totally passive role and runs the risk of losing their interest and attention. Asking questions keeps them potentially active, involved and on their toes. So, instead of saying; "Now, we divide the

numerator by the denominator," you would say: "Now, what do we do? Thus, instruction proceeds through a lengthy succession of questions with as few statements as possible. This is a difficult rule to master since most of us are used to doing the telling. It takes restraint and redirection to change from telling to asking. Ideally, most of the statements that are made in "teaching" the lesson should end with question marks.

EVENT NO. 4. USE QUESTIONS THAT ASK STUDENTS TO PERFORM RATHER THAN TO EXPLAIN. The key here is to try to use questions that begin with the word "what" and to try to avoid questions that begin with the words "how" or "why." Remember that remedial learners have not been very successful in school which means that they have not been reached by the more traditional teaching approaches. Also, their analytical skills are weak. They must first learn how to do intellectual-type operations such as mathematics and experience success at the performance level before they can even begin to be concerned with the underlying theory and rationale. "Why" and "how" questions scare them and drive them out of the field of action. Ask them what they get when they perform the next step in an operation rather than either how to perform the operation or why the operation is performed. Learning the "whats" of subjects like mathematics must precede learning the "hows" and "whys." Again "what" questions are the very kind that most students will be able to

answer correctly. Again, this requires a redirection for most of us in our approach to teaching.

EVENT NO. 5. HAVE STUDENTS CALL OUT THEIR ANSWERS RATHER THAN WAITING TO BE CALLED ON. All of our conventional wisdom seems to be falling by the wayside. But remember who our students are. They are not the middle-class achievers of the suburbs who wave their hands wildly over their heads every time the teacher asks a question to try to win the opportunity to demonstrate their thinking power. These are students who have spent years trying to find safety in the far corners of their classrooms while praying that they would not be called upon. On those occasions when their hoped-for invisibility was breached by the teacher calling on them, their resulting fear would tie their tongues and leave them to experience failure and ridicule.

To break the pattern, students must (1) be free to choose whether or not they want to answer and (2) feel confident that their answer stands a very good chance of being correct. If hand-raising is used, you, the teacher, become the determiner of who answers as much as if you call on students directly either at random or by design. If calling out is the rule, students themselves become the determiners. If they experience success, their propensity to answer will increase. Moreover, keep in mind that the question-answer approach is a way of teaching and not an individual performance test. It's a way of delivering

relevant information to active, attentive students.

What do you do if no one calls out an answer? To keep the rhythm of the process and avoid embarrassing anyone, including yourself, the best thing to do is to supply the answer yourself. Don't wait too long either because long periods of silence do nothing more than build tension. After not very long you may be surprised to see students calling out all the answers so that your questions no longer seem rhetorical. If you've made the questions answerable and overcome the fear associated with classroom participation, this is exactly what will happen.

EVENT NO. 6. RESPOND NEUTRALLY TO STUDENT ANSWERS, RATHER THAN WITH PRAISE OR CRITICISM. We have been conditioned, both by our own experiences as students and by studies done on middle-class students, to believe that correct answers should be praised and perhaps that incorrect ones should be criticized. Our results show unequivocally that with remedial students both types of reaction are wrong. The reaction most often associated with improved student achievement is a neutral one such as simply repeating the student's correct answer or continuing on to another answer (if the previous one was wrong) or another question (if the previous one was right). Responses such as "you're right," "correct," "wonderful," should be avoided. This may well take some practice on your part since we are all used to greeting correct answers with such explicit positive

affirmation. But it is the implicit or unspoken affirmation that makes it clear than an answer is correct without combining it with a "pat on the head." Perhaps students who have come to expect a "kick in the pants" cannot allow themselves to lend their trust to a pat on the head.

EVENT NO. 7. ACQUIRE CONSTANT FEEDBACK ABOUT STUDENT PROGRESS THROUGH MONITORING. It is important to know when students are not learning so that you can stop and backtrack in an effort to fill the void. A television teacher might lecture for an hour to a room full of sleeping students and never know that nothing was being learned. You, however, are "live" with your audience right before you, so that you can take pains to be monitoring their progress all the time. When they are doing seatwork, wander among them and look over their shoulders. Ask them how many got an exercise right or how many understood a point and call for a show of hands. But, most importantly, listen to the constant stream of answers they emit to your constant stream of questions. This will tell you what is being learned and what mistakes are being made. And, when you detect a pattern of mistakes, call for a show of hands and go back to those areas where the problems lie. Otherwise, you might just as well be talking into a hollow tube and hearing nothing but the echo of your own voice.

EVENT NO. 8 SPEND THE BULK OF CLASS TIME IN INSTRUCTION. Researchers refer to the phenomenon in question here as time-on-task. It refers to the time students spend engaged in the instructional process. The more time students spend on task, the more they can learn. There can be two culprits that cause time to be spent off task. Students, themselves, are one. They can daydream, snooze, read a comic or otherwise avoid the task. If you follow the first seven rules, you should be able to keep them on task much of the time. But the other culprit is you. You must keep yourself on task and this requires both planning and discipline. Don't let yourself be sidetracked by so-called "housekeeping" chores or other diversions. Plan to stick to the lesson for the entirety of the allotted time and then try diligently to stick to your plan. Remember, students can only learn when both you and they are on task and they can only be on task when you are.

Now that you've read about the eight EVENTS, you can see that they form a pattern, style or rhythm of teaching that is active, alive and orchestrated by you. You are the conductor who leads the students through a series of exercises by asking questions. Your rhythm or tempo, which your students become resonant with, should be geared to keep their interest and attention while producing demonstrably successful performance at the same time. (One is almost tempted to call this the "rhythm

method" of teaching but that monicker would be too "pun"-ative.

If you want to master this approach and, hence, be as successful as our teachers were, then you are going to need some help. It is virtually impossible to teach and monitor yourself at the same time since teaching demands every bit of your attention. What you need to do is arrange to have one of your classes videotaped each week for say a half an hour. View the tape and look to see whether you are incorporating the eight EVENTS into your teaching. Pick out one EVENT each week to concentrate on and then check on the subsequent videotape to see if you have succeeded.

Being a successful teacher is an important and demanding goal. Being successful with students who have had little academic success is perhaps even more important and certainly more demanding. If you want to attain this goal you will have a good chance if you go about systematically attempting to build the eight EVENTS into your method of teaching.